



Research Article

EXTRACTION AND ANALYTICAL STUDY OF *SEMECARPUS ANACARDIUM* L. SEED OIL

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ABSTRACT

Bhallataka, also known as the marking nut or dhobi nut, is a potent ingredient in Ayurvedic medicine. Despite its irritant nature, it's been used for centuries to treat a myriad of diseases. Its oil, extracted using the *Patala Yantra*, is a key formulation in Ayurvedic pharmaceuticals. Ayurveda, the ancient Indian system of medicine, is gaining global recognition for its holistic and natural approach to health. A significant part of Ayurvedic treatments are plant-based, ranging from raw plant materials to refined extracts. One such plant is *Semecarpus anacardium Linn*, the botanical source of *Bhallataka*. The plant is being traditionally used by the ancient healers in clinical practice. Apart from the clinical uses the plant was also used for marking clothes, as hair dyes and in many non-therapeutic uses as well. *Bhallataka* is a plant which holds much significance in Siddha and Unani system of medicine. Various studies have been conducted to understand its physical and chemical nature of the plant, in order to understand its use in therapeutic purposes. Chemical and phytochemical analysis of *Bhallataka* nut reveals a treasure trove of bioactive compounds- biflavonoids, phenolic compounds, bhilawanols, minerals, vitamins, and amino acids. These compounds make *Bhallataka* effective against various diseases like arthritis, tumors, and infections. The oil of *Bhallataka*, extracted using the *Patala Yantra* method, is particularly noteworthy. This oil is an integral part of Ayurvedic pharmaceuticals, and its application is referenced in various ancient texts.

INTRODUCTION

In Ayurveda, *Bhallataka* is revered for its ability to promote intellect and *Agni* (digestive fire). *Bhallataka* oil is indicated in various disorders such as *Medoroga*, *Meha*, *Krimi*, *kushta Roga*, *Asrha Sukra Roga*, and *Kapha Roga*. It is considered under *Visha-upvisha varga* in *Rasa shashtra*. As per the concept, *Vishopayogiya*, explained in *Ashtanga Samgraha*, emphasis has been given to the use of *Visha dravya* (poisonous substances) in disease treatment. When all other drugs fail, *Visha dravya*, including *Bhallataka*, effectively cures the disease. [1] The therapeutic potential of *Bhallataka* can be harnessed by isolating its active principles in the form of oils, flavonoids, and phenols. Understanding the organoleptic and

physiochemical analysis of *Bhallataka's* components can greatly aid in deciphering its pharmacological action. The more we learn about this remarkable plant, the more we can leverage its healing properties for the betterment of human health. The Indian knowledge of herbal medicines is gaining widespread acceptance globally. In Ayurveda, most of the medicinal preparations are derived from plants, whether in the simple form of raw plant materials or in the refined form of crude extracts, mixtures and so on. *Semecarpus anacardium Linn*. (Family: Anacardiaceae) is a plant well-known for its medicinal value. Chemical and phytochemical analysis of its nut reveals the presence of biflavonoids, phenolic compounds, bhilawanols, minerals, vitamins and amino acids. *Bhallataka* is said to be an excellent drug in Ayurveda to promote intellect and *Agni* (digestive fire). *Bhallataka* oil is indicated in various disorders such as *Medoroga*, *Meha*, *Krimi*, *kushta Roga*, *Asrha Sukra Roga* and *Kapha Roga*.

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Vernacular Names

English -Marking nut tree

Hindi - Bhilawa, Bhela

Synonyms of *Bhallatak*

Bhallataka, Dahana, Arushkara, Krimighna, Vatari, Prthagvija, Agni, Tapana, Anala, Taila-bija, Sphotaka-bijaka, Dhanurvija

Chemical Composition

Nuts include the bioflavanoids A, B, and tetra hydrobusta, tetra hydromenta, and nalla flavones.

Toxic Part Fruit

Colour - Hard, black rind within which brownish, oily juice known as *Bhallataka* oil is present.

Weight - 1.5 to 3.5 gm Oil

Colour: Brownish, oily

References of *Bhallatak* oil in Samhitas

In *Charak Samhita*

The method of extraction of *Bhallatak* oil has been mentioned in *Vyadhitarupiya vimaan adhyaya* 7/25, where the Acharya has mentioned method of *Bhallatak tail paatan* as well as its internal use along with *Vidanga churna* for the purpose of *Virechan* in *Krimi chikitsa*.^[2]

Sushruta Chikitsa Sthana

In *Sushruta Chikitsa sthana*, *Bhallatak Tail patana* method has been described an its therapeutic use has been mentioned in same chapter, as

regimentation of scar after wound healing.^[3] The term *Durudha* that has been used in the citation, means wounds that heal with difficulty and leave scar after healing.

Author says that this oil should be applied with the incinerated hooves of horse and buffalo for the purpose of the re-pigmentation.

Rasa Ratna Samuchya

Bhallatak oil has been mentioned in *Tail varga* in *Rasa Ratna Samuchya*.^[4]

As Per Chakradutt

Bhallataka taila is indicated in *Kushta roga*.^[5]

MATERIALS AND METHODS

Bhallatak tail extraction

The *Bhallatak* oil is extracted in *Patala yantra* by *Pishta swedan* method as is mentioned in Ayurveda classics. The *Ashuddha bhallatak* fruits were kept inside a vessel after cutting of the pseudocarp. The mouth of the vessel was wrapped with the iron mesh and another small vessel was fitted upon this large vessel. It was then wrapped with a mud smeared cloth and then put in a pit. It was then covered with the cow dung cakes and fire was ignited. The oil from the fruits was extracted and got collected in a small vessel. ^[6]

Yield of the oil: 250gm of *Asuddha Bhallatak* seeds were taken and 100ml of *Bhallatk* oil was extracted from the taken *Bhallatak*. Yield was found out to be 40 percent.



Asudha Bhallataka



Kapadmiti to Pots



Pots kept for *Putra*



Sheet oil collected in pot



Pots kept for *Swang*



Pots taken out from *Putra*

Macroscopic and Physiochemical Description of *Bhallatak* Oil

Appearance	Shiny black coloured viscous liquid
Color	Dark brown
Odor	Characteristic
Loss on drying	0.48%
Refractive Index	1.474
Weight per ml	0.9234
Qualitative test	Negative for mineral oil
TLC	Showed the presence of <i>Bhallatak</i>

Various chromatography techniques reveal that the crude seed oil is rich in neutral lipids, followed by glycolipids and phospholipids. The oil is also abundant in linoleic, palmitic, and oleic fatty acids. Interestingly, the ratio of unsaturated fatty acids to saturated fatty acids is higher in neutral lipid classes than in the polar lipids. The oil also contains sterol compounds like β -sitosterol, campesterol, and stigmaterol, and tocopherols like δ -Tocopherol and β -tocopherol. When compared to extra virgin olive oil, *S. anacardium* seed oil showed a stronger radical scavenging activity, making it a potent antioxidant. This rich composition of *Bhallataka* makes it a powerful Ayurvedic ingredient.

As per the latest researches on the *Bhallataka* seed oil it was found that the essential oil extracted from the nuts of the plant is a source of biologically active compounds which may potentially prove to be efficient antimicrobial agents.

As per an fascinating insight from an accelerated study conducted as per the Guidelines of ICH Q1A (R2), it exceeds the shelf life stated for *Taila kalpana*, a similar preparation, in the Drugs and Cosmetic Act 1940 (D & C act 1940) and Rules. One of the reasons for this extended shelf life is the unique formulation of *Bhallataka* Oil. Unlike other *Taila* preparations, it doesn't incorporate any liquid medium such as *Swarasa* (juice), *Kwatha* (decoction), which results in a low degradation rate. Another key factor is the oil's rich content of PUFA (poly unsaturated fatty acid) and high levels of tocopherols. These compounds are believed to protect PUFA from peroxidation, contributing to the increased duration of shelf life.

CONCLUSION

Bhallataka, or *Semecarpus anacardium*, has been used since the dawn of civilization to cure ailments worldwide. The literature reveals a wide range of pharmacological actions for this herb, and there is still much to explore in this field. However, it's important to note that, according to Ayurveda, *Bhallataka* should only be taken after cleansing. This purification process is crucial in minimizing side effects during internal administration.

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